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## NOTES

### SYNAESTHESIA IN A CHILD OF THREE AND A HALF YEARS

Edgar Curtis is the son of Professor and Mrs. O. F. Curtis of Cornell University. At the time of this writing he is three years and seven months old. He has never been particularly interested in colors, and he knows only the names of hues of good chroma. He calls rose, and various tints of pink, red. He uses his own descriptive words, however, and he often calls a color reddish, red and orange, etc.

About two months ago his mother noticed for the first time that apparently he has colored hearing. Their home is not far from a rifle range, and the sound of the guns resounds through the hills with a loud 'boom'. One day Edgar asked: "What is that big, black noise?" A few days later he was being put to bed on the sleeping porch. Two crickets were chirping loudly, one of them having the usual cricket-sound with which he is familiar, the other having a very high, shrill chirp in comparison. He asked: "What is that little white noise?" When his mother told him that it was a cricket he was not satisfied, and he said: "Not the brown one, but the little white noise." Then he imitated both of them, calling the lower brown and the shriller of the two white. At another time, when a cricket-chirp uttered from farther away came with a resonant buzz, he called it red.

He calls the sound of the cicada white. The electric fan is orange, and the electric cleaner which has a deep 'burr' is black. The sound of a frog, neither very high nor very low, is bluish. A little Japanese bell is red when rung loudly, and white when it tinkles faintly. A squeaking door is black and white. One could distinguish in that sound two tones of different volume. Drumming on the back of a guitar, when the opening is held to his ear, is black. An engine makes a black noise, but an electric pump is black and white. The low notes of the chimes are brown and black. The shrill crying of a little child is white. The rhythmic rise and fall of the noise made by a street-car in motion is orange. A can is black when it is pounded upon, and when the sound is dulled by touching it with the finger it is red. Thunder is black. A Scotch woman with a broad burr in her speech read him a story, and later he said to his mother: "Do you know what color it is when she reads? It is black."

All the above information has come from the child's casual conversation. He takes it for granted that everyone has the colors that he has, and will often remark: "That noise is red, isn't it?" His parents have been careful not to suggest colors to him, and they have not either suggested that a sound may be of a different color from the one he has named. During a few little experiments, the experimenter sometimes said, "I think that color is white," when Edgar had said it was something else. Every time he was very positive that he was right, and he was manifestly disgusted that anyone could think the sound was white when he had said it was red. He often goes to the piano when he is alone in the room, and to amuse himself touches the keys and tells the colors of the sounds. Notes have been made on those colors when he was not aware that he was overheard. Middle-C is red, and the tones just below are red or red-purple. The bass is black, and the high tones are white. Between middle-C and the white tones are reddish and bluish tones. Edgar never of his own accord named tones yellow, green or gray; but during some later experiments he found tones for them after seeing the color. One day, upon seeing a rainbow, he

exclaimed, "A song, a song!" We thought that this reaction might be a mere matter of association; and we decided to see whether, if he were shown colors, he would find the corresponding tones on the piano.

Red, orange, yellow, green, blue and purple papers of good chroma were used, with the addition of black, white and middle gray. He played with the colors for a few minutes and he was delighted with the idea of trying to find them on the piano. Following are the tones he selected, every color having the tone named and one or two tones above or below.

a' ' ' and all tones above	White
b' ' '	Yellow
e' ' '	Green
e' '	Blue
c' (middle-C)	Red
a	Orange
A	Grey
E and all tones below	Black

He selected the tones by playing about on the keys with one finger, and saying, *e. g.*, "This isn't red! This isn't red!" and then gleefully, when he found a tone that suited him, he exclaimed: "This is red, isn't it?" It was interesting to notice that when he was searching for red he did not explore the white or black region, but when grey was given him he went immediately toward the black, and when yellow was given him he went toward the white tones.

We thought that tones of the same musical pitch might possibly be of the same color to him. We found, however, that on the guitar white was  $e'$ , which on the piano was blue. On the guitar,  $c$ -sharp was black, though that region on the piano was red and orange. On the guitar, again,  $g$ -sharp was red and black, while it was red on the piano. One high tone on the guitar was called "a little baby white one."

From Edgar's own adjectives, and from the distribution of the colors on the keyboard, it seems that noises or tones of low pitch and large volume are black or brown or grey, while shrill, high, piercing, thin tones are white; the other colors range over sounds of intermediate pitch and volume. The normal order appears to be orange or orange-red, red, red-purple, blue; then follow, under the experimental conditions, green and yellow. There is some uncertainty as to the red-purples. Our investigation has, however, been so imperfect that such uncertainties were to be expected; it is only the primary and general outcome that we wish to emphasize. We hope that later studies may be made under stricter experimental safe-guards.

ANNA KELLMAN WHITCHURCH

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## URBAN'S TABLES AGAIN

Typography of statistical tables is so difficult that complete accuracy is long in being achieved. Urban first published his tables for the method of constant stimuli in 1912 [*Arch. f. d. ges. Psychol.*, 1912, 24, 240 f.]. He reprinted them, making two corrections that he had discovered, in the *Praxis der Konstanzmethode*, 1912, 20 f. Then Rich [*Amer. J. Psychol.*, 1918, 29, 121] discovered a third error, and Godfrey Thomson reprinted the tables with all three errors corrected [W. Brown and G. H. Thomson, *Essentials of Mental Measurement*, 1921, 194f.]. Now Mr. Howard H. Long of Paine College discovers that the value of  $2\gamma P$  for  $p = +.73$  should be 0.7551 (exactly 0.755068), instead of 0.7541 as it occurs in all the printed tables. Apparently a typographical error!

This discovery of the fourth error affects Rich's checking tables [*Amer. J. Psychol.*, 1918, 29, 120 f.; Brown and Thomson, *op. cit.*, 198 ff.], which have taken account of the first three corrections. In Rich's tables the value for  $p = .73$  and  $x = +2$  should be 7.2317 (instead of 7.2307), and the value for  $p = .73$  and  $x = -2$ , 2.2365 (instead of 2.2373).

It may be well to suggest, in case someone again reprints the Urban tables as now corrected by Mr. Long, that the tables should be set up with horizontal rulings every five lines. This change Urban himself recommended after the issue of the *Praxis*. Both the tables in the *Praxis* and in Brown and Thomson have to be ruled by pen if they are to be put to much practical service.

E.G.B.

### EXPERIMENTAL PSYCHOLOGY IN THE TALMUD

The following tale from the Babylonian Talmud<sup>1</sup> shows (if it be true!) that the method of expression and the use of the plethysmograph would have been understood by a psychological audience of the first century of our era. The tale is told of Vespasian, who is conversing with Rabbi Johanan ben Zakkai.

"In the meantime there came to him a messenger from Rome and spake to him saying: Up, for the Caesar is dead, and the nobles of Rome have agreed together to choose thee for their Caesar. Now he had at that time drawn on one of his shoes, and was in act to draw on the other, yet would not his foot pass therein; then he set himself to pull off that which he had drawn on, but it clave to his foot. Thereupon spake Johanan to him and said: Be not disquieted! Thou hast received good tidings, and it is written: A good report maketh the bones fat.<sup>2</sup>—What, then, said he, must I do?—And he said: Make to pass before thee some man that thou hatest; for it is written: A broken spirit drieth the bones.<sup>3</sup>—Then he did as Johanan had counselled, and his foot passed into the shoe."

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S. FELDMAN

### THE MAX KLINGER BUST OF WUNDT

Dr. Walter N. Niles, of the Carnegie Nutrition Laboratory, has been good enough to inform me that a photographic reproduction of the Klinger bust, to which I referred in this JOURNAL, xxxii., 1921, 177, is issued as no. 225 of the postcard series of the Museum der bildenden Künste zu Leipzig (Verlag von E. A. Seemann in Leipzig). The pose is that of the lecturing Wundt: the head is thrown back rigidly, and the moustache is lifted above the lower lip, in a way characteristic of Wundt on the platform but unnatural to him in any other situation. The whole head is magnificently conceived, and the longer one lives with it the more certainly can one read parts and phases of the familiar Wundt out of it. It is, however, not a portrait bust.

E.B.T.

<sup>1</sup>*Gittin*, 56 b; L. Goldschmidt, *Der babylonische Talmud*, v, 1912, 546. This redaction of the Talmud was completed c. A. D. 500.

<sup>2</sup>*Proverbs*, xv, 30.

<sup>3</sup>*Ibid.*, xvii, 22. These two sayings, which themselves contain the gist of the whole matter, belong to the earliest collection of Proverbs, the accepted date of which is not later than B. C. 250.